

CLAIMS

We claim:

- 1 1. A gasification reactor vessel, comprising:
2 a pressure shell, said pressure shell having an encircling body wall and
3 shell ends at each of opposite ends of the body wall;
4 a plurality of cooling ducts extending around an outer surface of said
5 body wall, said ducts being fixedly connected to said outer surface, interior spaces of said
6 cooling ducts communicating with said outer surface;
7 a fluid supply conduit communicating with said cooling ducts;
8 a fluid discharge conduit communicating with said cooling ducts; and
9 a lining of a refractory encircling an inner surface of said encircling
10 body wall.
- 1 2. A gasification reactor vessel according to claim 1, wherein each cooling
2 duct comprises a pair of spaced webs fixedly connected at common edges of each to said body
3 wall outer surface, and an arcuate segment joining opposite edges of said webs.
- 1 3. A gasification reactor vessel according to claim 2, wherein the webs of
2 each duct are fixedly connected to said body wall outer surface with welded connections.
- 1 4. A gasification reactor vessel according to claim 2, wherein said ducts
2 extend longitudinally of said body wall, said fluid supply and fluid discharge conduits are
3 annular and located, respectively, at one of two opposite ends of said shell body.

1 5. A gasification reactor vessel according to claim 4, wherein said ducts
2 each are spaced on said body wall outer surface circularly from ducts adjacent thereto.

1 6. A gasification reactor vessel according to claim 4, wherein said ducts are
2 arrayed circularly around said body wall outer surface with each duct in abutment with ducts
3 adjacent thereto.

1 7. A gasification reactor vessel according to claim 2, wherein said ducts
2 extend circularly around said body wall outer surface, said fluid supply and fluid discharge
3 conduits being annular and disposed, respectively, at one of two opposite ends of said shell
4 body .

1 8. A gasification reactor vessel according to claim 7, wherein said ducts are
2 arranged obliquely of a central axis of said body wall.

1 9. A gasification reactor vessel according to claim 8, wherein said ducts
2 extend in a spiral course around said body wall outer surface.

3 10. A gasification reactor vessel according to claim 7, wherein each duct
4 encircles said body outer wall surface spaced from ducts adjacent thereto.

1 11. A gasification reactor vessel according to claim 1, wherein said
2 refractory lining comprises at least two separate concentric layers of refractory material.

1 12. A gasification reactor vessel according to claim 11, wherein the
2 refractory material is at least one of a ceramic and polytetrafluoroethylene.

1 13. A method for gasification of ash-free and low ash fuels, residues and
2 waste comprising:
3 reacting said fuels, residues and waste with an oxygen-containing
4 oxidizing agent in a reaction space of a pressure vessel of a fly stream reactor, said pressure
5 vessel having a refractory lining therein: and
6 regulating a temperature of said pressure vessel so that said temperature
7 is above a dew point temperature of any water contained in a gas atmosphere present in said
8 reaction space.

1 14. A method according to claim 13 further comprising setting a pressure of
2 the coolant flowable in said ducts irrespective of a pressure present in said reaction space,
3 whereby the temperature of said pressure vessel can be regulated for maintaining said pressure
4 vessel temperature above a dew point temperature in the reaction space.

1 15. A method according to claim 13, wherein the temperature of said
2 pressure vessel is regulated to be more than at least about 5° C above the dew point of any gas
3 atmosphere water present in said reaction space.

1 16. A method according to claim 13, wherein said pressure vessel has
2 cooling ducts on an outer surface of said pressure vessel for regulating the temperature of said

- 3 pressure vessel with coolant flowable through said ducts, and regulating pressure vessel
- 4 temperature with coolant which is above or below coolant boiling point.